

# Blasting Regulations Changes & Flyrock



**DMME**  
**Division of Mineral Mining**  
**Created 2009**

# Regulation Changes Effective July 8, 2009



- Parts VI & VII, Explosives and Drilling, Safety and Health Regulations For Mineral Mining.



# Storage

## 4VAC25-40-780



- 2009 changes:
  - 780.C.3. Magazines must be of “substantial construction and constructed of noncombustible material” or covered with fire-resistant material.
  - 780.E. The ATF is now the ATF&E (Alcohol, Tobacco, Firearms and Explosives) and is now under the Department of Justice.

# Use Of Explosives

## 4VAC25-40-800



- 2009 changes:
  - 800.D. “Flyrock incidents shall be reported to DMM immediately and details noted in the blast record”, added at end.
  - 800.G. “the certified blaster in charge shall”, carry out items 1 thru 4 (monitor weather, inspect blast site, inspect boreholes and clear site of people and equipment).
  - 800.H. (totally new wording) The certified blaster in charge shall review the drill logs to determine specific down-hole conditions prior to loading the shot.
  - 800.I thru 800.U. Because of the all new wording of 800.H above, the old wording of “H” thru “T” is now “I” thru “U”.
  - 800.Q. (formerly 800.P.) Areas containing loaded boreholes shall be guarded or barricaded “and posted” to prevent unauthorized entry.
  - 800.U. (formerly 800.T.) The all clear signal must be given by the certified blaster “in charge”.

# Recordkeeping

## 4VAC25-40-810



- A detailed record of each blast shall be prepared immediately by the certified blaster.
- 2009 changes:
  - 810.3. Name, signature and certification number of “the certified” blaster in charge.
  - 810.5. Number of holes “and” burden and spacing “for each hole”.
  - 810.6 All new wording, “Drill logs of boreholes as required by 4VAC25-40-1095.”
  - 810.15 Type of detonators used and “timing of detonation for each detonator used.”
  - 810.19. New sub-section, “All anomalies or abnormalities occurring during the execution of the blast and actions taken to correct or address them.”

# Ground Vibration Limits

## 4 VAC 25-40-880



### 2009 changes:

- 880.A. The Ds (scaled distance) factors are removed from the table.
- 880.B. New wording to require seismograph use in most cases, “Seismic monitoring of each blast shall be conducted, unless the scaled distance, Ds, (using the formula provided) is 90 or greater”. “Ds =”, explanation removed since the factors are no longer given. Scaled distance must be calculated per the formula shown.





# Air Overpressure Limits

4VAC25-40-890



## 2009 changes:

- Title of this regulation changed from, *Airblast limits*.
- Acceptance of multiple types of equipment and peak readings has been removed, “Air overpressure resulting from surface blasting shall not exceed 133 decibels as measured with a 2 Hz or lower flat response microphone at any inhabited building not owned or leased by the operator.”

# Action Plans

4VAC25-40-893



- New regulation in 2009:
  - “Each operator shall maintain a plan to control the effects of blasting on areas adjacent to the operation. This plan will be documented and made available for review by the Division of Mineral Mining upon request”.
- This regulation attempts to address the rising number of complaints from property owners surrounding mine sites.



# Action Plan Suggestions



- Avoid “cookie cutter” plans! It is expected that these plans be site specific in outlining what is being done and what will be done in a given circumstance.
  - Monitoring:
    - Where? Any permanent sites?
  - Technology:
    - Any studies/analysis of data gathered (seismic information, including frequencies)?
    - Experimentation with new materials/equipment?
  - Community Outreach:
    - Are you notifying any neighbors prior to blasting?
    - Any conversations with neighbors about changes at the mine?
    - Any involvement with community groups?

# Plan Suggestions, cont.



- Company Policies:
  - Internal guidelines for handling complaints/inquiries?
  - Internal guidelines/limits for overpressure and vibration?
- Local Governments:
  - Any outreach? Meetings? Educational opportunities?

# Electronic Detonators

4VAC25-40-925



- New regulation in 2009:
  - “Electronic detonation systems shall be approved by the Director as providing performance equivalent to that required in 4VAC25-40-920 (electric detonators), and shall be used in accordance with the manufacturer’s instructions”.

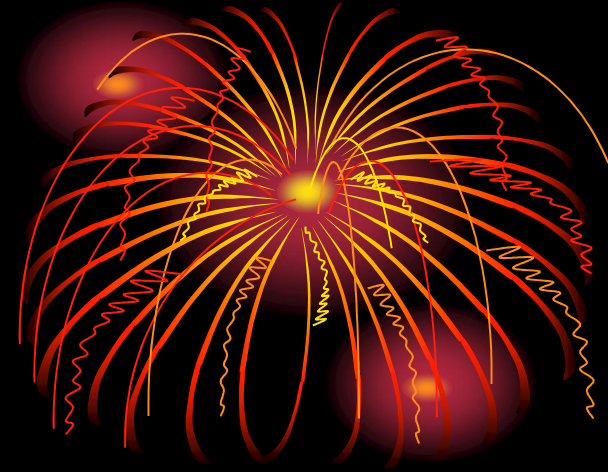
# Drill Logs Required

4VAC25-40-1095



- New regulation in 2009:
  - “For each borehole intended for blasting, the driller shall produce a drill log as each hole is being drilled. The drill log shall include, at minimum, the name of the driller, borehole diameter, borehole depth, depth of broken material at the collar, and other geological conditions (for example, cracks, seams, voids, mud, or other anomalies that could affect the blast) encountered during drilling. A signed copy of the drill log shall be provided to the mine operator and a copy shall be included in the record of the blast.”

# Flyrock



- Defined in the state regulations as, “Any uncontrolled material generated by the effect of a blast that was hazardous to persons, or to property not owned or controlled by the operator”.



# Blast Design Must Prevent Flyrock. *Flyrock incidents are to be immediately reported to DMM*

4VAC25-40-800.D



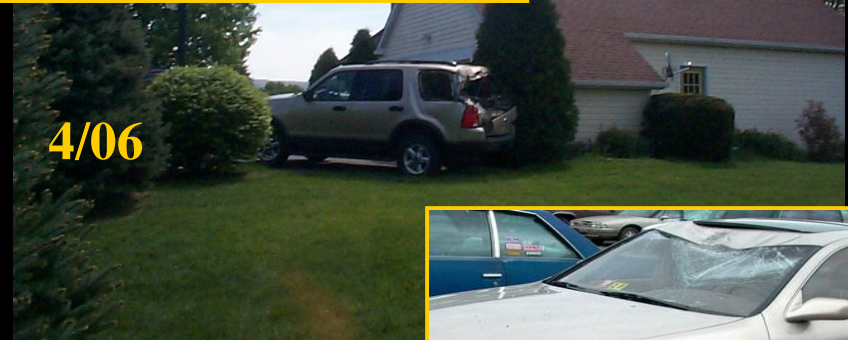
**January 2007**

*Flyrock usually results in a closure order issued to the mine operator requiring a DMM-approved blasting plan, and a notice of violation issued to the blaster.*

# Flyrock Accidents:

Nov. 2005, April 2006, Aug. 2006

- 11/05, shot utilized a gasified emulsion product that expands in the borehole. Flyrock damaged a commercial building.
- 4/06, production shot that included 13 boulders sent flyrock across a 4-lane highway damaging vehicles and buildings.
- 8/06, not enough energy to move the front row burden resulted in flyrock that damaged homes and vehicles.





# Flyrock Accident February 2008



**Blast site**

**Damaged siding on house**



**Drill log showed two front holes intersecting mud seams yet they were fully loaded with explosives.**

# Blasting Incidents

## April 2007, October 2008

- In April 2007, 4 to 5 fist-size rocks were thrown 545 feet to an area where seven miners were located, one who was assigned to video tape the shot.
- In October 2008, a volleyball size rock was thrown 1700 feet hitting a MCC building located 100 feet from the jaw crusher operator's booth. The crusher was manned and operating at the time.





# DMM Flyrock Investigation Findings





- Failure to accurately measure burden on the free face.
- Adverse geology.
- Inadequate relief, as with a floor shot.
- Shallow bore holes.
- Insufficient energy.
- Boulder blasting.
- Insufficient timing.



# Blasting Safety Reminders



- Proper training for all people working on the shot. Helpers must be aware of specific hazards.
- The certified blaster in charge is in direct charge of all activity at the blast site.
- Be certain the blast area is large enough to ensure the safety of all personnel.
- Be certain all equipment and personnel not involved in loading the shot are cleared from the blast site prior to bringing explosives to the site.
- The certified blaster in charge and the certified foreman must make post blast inspections prior to personnel returning to the area.
- Personnel must check their work area for hazards.